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ABSTRACT

Distance learning educators may utilize techniques formerly designed for students with learning disabilities (LD) to enrich the experience of distance education students. Both LD and distance learners suffer from "learned helplessness"--an inability to set realistic goals and a limited perception of the rewards of education. These problems, coupled with the transactional distance felt by learners in distance education, create a need for new teaching strategies that benefit both LD and distance learners. Faculty must become more aware of how to utilize technology to improve student learning experience and realistically plan courses that include more hands-on activities. Instructors should also create conditions where students have equal access to technology that is not too difficult to operate. In addition, multimedia resources must be integrated into the course and evaluated to address the needs of both LD and distance education students. Colleges should no longer assume that only students with learning disabilities benefit from adaptive technology applications. New technologies and teaching strategies initially designed for the learning disabled may also have a positive impact on the learning experience of both traditional and nontraditional students. Contains 23 references. (YKH)

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Hope is not a Method:
How Instructional Strategies and Technologies for the Learning Disabled can Benefit Traditional Learners

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Hope is not a Method: How Instructional Strategies and Technologies for the Learning Disabled can Benefit Traditional Learners

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Presented by

Catherine Jay and Cliff Blackerby

Abstract

When asked what hope is, the answers to the question are wide and varied. Responses include; a girl's name, a town in Arkansas, a chest, and the name of a ship or diamond. Hope can be all of these things but it is not a method! Successful distance learning programs result from implementing carefully planned strategies, founded on sound methods, not hopes. Technology continues to grow in importance in distance education as a result of its ability to mediate communication and enhance the learning process for both students and teachers. Professionals in the field are finding technology-based solutions to plan and implement teaching strategies directed toward targeting specific learning and knowledge processing deficiencies of students. As a discipline, distance educators are discovering that instructional strategies and technologies, which were originally targeted for the learning disabled, now have immense application to help the at-risk and traditional students as well. This paper addresses some of the teaching strategies and technology solutions distance learning educators can apply to enrich the experience of all distance learners.

Introduction

It is not uncommon for a faculty member or trainer to meet with a new class and discover a special challenge. One or more of our students are classified as a student who has a learning disability. It is also not uncommon to find that when we encourage the use of adaptive technology and modify our teaching strategies, we find we have a serendipitous impact on our more "traditional" students. By using the capabilities made available to us through technology designed for students with learning disabilities and integrating technology with innovative teaching strategies, we can improve the learning environment for all of our students and trainees.

The longer we teach or work in a training environment, the more likely it will become that we will be forced to deal with the issue of designing and delivering training to students who process information differently than students we define as traditional. Curricula and course offerings for distance learning are expanding, and so are the possibilities that each of us will have to wrestle with the question, "How will I meet the needs of each of my students or trainees?" Hope is not a method. Hope will not ensure our success. Only by planning in a systematic, carefully crafted manner will we be able to integrate instructional strategies and technologies to overcome the limitations of meeting the educational needs of students with special requirements. In doing so, we are likely to find we have also found a way to improve the learning of our traditional students.

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This paper's focus is only on learning disabilities faculty and trainers might expect to encounter in the classroom. It does not address adaptive strategies for mobility disabilities. For those who have an interest in technology for mobility solutions, additional research is recommended.

Definition o f Learning Disability

The National Joint Committee on Learning Disabilities (1988) developed the following definition of learning disabilities:

> **Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur concomitantly with other handicapping conditions (for example, sensory impairment, mental retardation, serious emotional disturbance) or with extrinsic influences (such as cultural differences, insufficient or inappropriate instructions), they are not the results of those conditions or influences. (Nolting 1991, p. 13)**

Our definition of learning disability is that it is "a difficulty in processing or remembering information." The capacity for learning is still present, still intact and fully functional, but the means of processing information is different from that considered "normal." For distance learning faculty and trainers there is an increasing probability of finding students with learning disabilities in our classes. This has tremendous implications for planning or program development and for the selection of effective instructional strategies.

Roueche and Roueche (1993, vii) noted, "All schools, colleges, and universities across the nation are failing at unconscionable levels to effectively meet the needs of students they enroll." Faculty are not being trained adequately in how to design and operate in a distance learning environment, and certainly not in how to meet the needs of students with learning disabilities, students that we can surely expect to see in our distance learning classrooms. Yet, it is easy to demonstrate how the value of using technologies and teaching strategies designed for the learning disabled have a positive impact on the learning experience of those we call "traditional" students. As individuals and as organizations we make incorrect assumptions when we assume only students with learning disabilities benefit from adaptive technology applications.

During the past decade, there has been increasing attention given to the use of technology and its ability to be adapted for students with learning disabilities. Early uses of LD technology have focused on instruction and remediation. To distance learning professionals, the true value of LD technology may be in its ability to circumvent the disadvantages caused by LD while capitalizing on the capabilities of technology to enhance student strengths.

Issues for Students with Learning Disabilities

Students with learning disabilities often have to overcome three specific issues to be successful, not only in their academic pursuits, but also as an important part of their overall life experiences as well. These issues are (1) learned helplessness, (2) inability to set realistic goals, and (3) a limited perception of the pay-off of education. (Roueche and Roueche, 1993) Not surprisingly, many of our traditional students have the same problems.

Learned helplessness is what we often see in our students as a lack of motivation. This is not purely a LD character trait. It is frequently a result of a student's feeling of a lack of control over the environment, a belief that no matter how much effort is made, that effort is doomed to failure. Trying to learn in a distance environment, where students may not have the academic and social support systems needed, can add to and reinforce the feeling of helplessness. How we as instructors develop our courses for delivery, how we encourage interaction, and how we provide positive feedback can impact, in a positive manner, all of our students.

It is not unusual for students, young or old, to demonstrate an inability to set realistic goals. They may choose goals that are too easily achieved and, as such, don't challenge their capacity to learn. Or they may choose goals that are unattainable, rationalizing that since they were too difficult; they couldn't be expected to achieve them anyway. As a part of the instructional design for distance learning courses we need to set and communicate realistic goals for our students. Not only do we need to help them establish goals, but we need to build in monitoring and mentoring functions in our programs to ensure goals are being achieved. The skills we develop in helping students with learning disabilities to become better goal setters are easily transferred to helping our more traditional students define their own goals.

The third issue is really one of self-esteem; it is the deeply ingrained belief that education is a poor pay-off. When students with learning disabilities can't overcome a lack of motivation and they can't set realistic goals, they, too often, can't see the value of an education. They share this idea with many of our poorer prepared traditional students. It is important to explain why an education is important and why the content they are learning in your class is pertinent. We need to be able to help them understand how it is relevant to their world and how it will be of use to them. Too many of our traditional students can't relate the coursework to anything important to them. Too often, they see courses as having no inter-relationship with work or educational goals. Selecting appropriate technologies and instructional strategies that build on establishing a quality learning experience for all distance learning students will provide long-term benefits for our students and our distance learning programs.

As we offer more distance learning programs and training opportunities, we are likely to find more and more situations which require the use of adaptive technologies and strategies in our classrooms. If we design instructional programs from the beginning to take advantage of the capabilities of technology, we can have a significant and long-lasting impact on student learning.

If, however, we wait until we find we have students with special needs, we are likely to find that we never do an effective job of providing a quality educational experience.

Transactional Distance

Michael Moore categorizes independent study and distance education programs in terms of transactional distance, which is an expression of the sense of distance felt by learners. Moore defines transactional distance in terms of two factors, dialogue and structure." (Verduin and Clark, 1991, p. 122) The transactional distance felt by students with learning disabilities could be overwhelming when the instructor has failed to consider special needs and apply appropriate instructional design and technology.

However, a faculty member/trainer who considers and designs curricula/programs to reduce the transactional distance will make material easier to learn for both LD and traditional students. By consciously planning for more dialogue and less structure in the program, we encourage all students to become more involved in the learning process. Students find an enriched learning experience by the increased opportunity to share ideas and explore learning concepts as dialogue is encouraged and fostered in the classroom.

Students with learning disabilities and traditional students gain from curricula that are designed to eliminate barriers to learning that excessive structure brings to the classroom. When we consider transactional distance and incorporate techniques to overcome it in our instructional strategies, we benefit not only the students with learning disabilities but also our other distance learning students.

Distance learning can contribute to an increased sense of transactional distance by its very nature of teaching students who are geographically separated from the instructor. For many of our students, technology can decrease the dialog and increase the structure in our distance learning classes causing the student to experience a sense of distance beyond that normally associated with distance learning classes. Recognizing that transactional distance is a barrier to learning, we can apply remedies that will help students overcome both the sense of distance and the actual distance experienced between the students and the teacher.

Needs

To be successful in integrating teaching strategies that benefit both LD and traditional students there are a range of activities that must be addressed. First, we must raise the awareness of faculty so that they consider in their instructional design

processes ways they might develop and use technology to positively improve the learning experience for all their students. Secondly, we have to educate the faculty in how technology can be used to help students compensate for poor learning or processing skills. Thirdly, it requires that we do a better job of realistically planning our courses. It means that our courses need to be better organized, technology needs to be better integrated, and that we need to apply the capabilities of technology to address the different learning styles of our students.

Courses and programs should be designed to include more hands-on activities; the activities need to be more relevant to student work and social interest; and the quality of written materials needs to be improved and adapted to complement and reinforce the desired learning objectives. If we address these areas for students with learning disabilities, we are likely to find we have provided a benefit for our other students as well.

Access Versus Opportunity

Access and opportunity are not the same for our students. In terms of our students with learning disabilities, access has two technical components: availability of technology and operational access. While we don't often think of our traditional students in these terms they can be affected in the same way as students with learning disabilities. The availability of technology affects the way we plan and deliver instruction. It impacts the quality of the technology support we are likely to have for our students and it affects our ability to present instruction in multiple modalities. Like our students with learning disabilities, traditional students are also affected by their access to technology.

Operational access refers to how easy the technology is to operate. Students who are diagnosed as learning disabled do not need the added burden of trying to learn software or how to operate technology that is complicated. They can easily become frustrated and discouraged. The same is true for traditional students. Trying to learn complex, new software packages or how to operate an unfamiliar piece of equipment while trying to learn subject matter content can be a daunting task for the most brilliant of our students.

A good example of unintended outcomes of operational access is the experience of Tomball Community College. For various reasons, it was deemed valuable for students to have graphic calculators to help them and see visually the results of their calculations. It was felt that a visual representation of their calculations would help them better understand math concepts. What had not been considered or factored into the experiment was the additional time and increased frustration students experienced in trying to learn how to manipulate the calculator in addition to wrestling with new math concepts. As a result, Tomball College has incorporated a calculator lab component to help address this issue. So, in selecting support equipment and technology we need

to consider operational access.

While access refers to the availability and ease of use of technology for learning, opportunity refers to what we do in the classroom to create and foster an active learning environment for all of our students. Our goal as teachers and trainers should be to create the conditions where all of our students have equal opportunity to learn. Planning for and applying the capabilities of technology available to us for addressing the needs of students with learning disabilities can improve the learning environment for all of our students.

Integration of Multimedia

The key to adaptive strategies and using multimedia to impact learning for LD and traditional students begins with defining the educational need. Answer the question, "How can I adapt the capabilities of technology or modify my instructional strategies so that I address the needs of students who exhibit learning disability traits?" Go a step further and examine how answers to those same questions could be used to design better programs for traditional students.

A part of that process is determining how multimedia can be used to address specific needs. What are the capabilities for addressing content delivery to students who have auditory or visual processing limitations? What can be done to aid students who are diagnosed as arithmetic or language deficient? Does technology offer remedies, that if we planned and implemented a comprehensive program, we would also see a marked increase in the learning achievements of our traditional students?

It becomes the faculty or trainer's responsibility, with support from other staff specialists, to determine exactly how to use a given multimedia application. Multimedia should become an integral part of our instructional design processes, planned so that its application will have the greatest impact on students. We should make use of multimedia's ability to address multiple modalities. Multimedia allows us to present our content message in different ways and different formats. Not only do we have a better opportunity to reach students with learning disabilities, but we also address the fact that all students have preferred learning modalities. When we fail to effectively use the capabilities of technology, we significantly reduce our capability to help students achieve their learning goals.

Finally, we have to evaluate multimedia solutions and applications. It is easy to use multimedia simply because it is available to us. To use it effectively and efficiently is another matter. There is a need to develop an evaluation plan that includes feedback about how effective the application of multimedia has been in helping students overcome learning barriers. Evaluation should not only focus on the students with learning disabilities, but include the traditional students as well. Technology is expensive and it is sometimes hard to justify its cost if we evaluate its impact on only the students with learning disabilities in our classrooms. By showing that technology interventions benefit all students we can show that the cost of acquisition of technology and training faculty in its use is a solid investment. This can only be done if we develop stringent evaluation criteria that demonstrate technology's value in improving learning across the board.

Adaptive Technologies and Strategies

It is important to remember that a person with a learning disability has difficulty processing, remembering, or expressing information. While their capacity for learning is intact, the means by which they process information is different. Since each person's learning disability is unique, appropriate accommodations will have to be determined on an individual basis. Choosing appropriate tools and techniques to help an individual compensate for a particular learning disability while capitalizing on personal strengths requires consideration of "(1) the individual's unique profile, (2) the function to be performed, and (3) the particular context in which the technology will be applied." (Riviere, 1996)

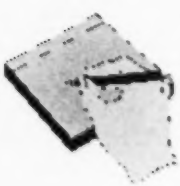
Learning disabilities can be visual or auditory processing disabilities, an arithmetic deficit disability, dysgraphia, dyslexia, or language comprehension deficits. A variety of low to high-tech accommodations have been developed to help people compensate for their particular learning disability, many of which are also beneficial to an at-risk, a non-traditional or an average student.

Visual Processing Disorder

People who have visual processing disorders may have trouble or be unable to see a specific image within a competing background, such as picking a sentence out of a page of text; see the difference between two objects; copy information from the board; align numbers on paper; or comprehend maps, charts, or graphs.

Possible classroom accommodations might include letting the student tape-record the lecture, providing the student with a copy of the lecture notes before the class begins, or allowing the student to use a note-taker. Some students find it helpful to turn their notebook sideways, creating vertical columns for numbers, variables, etc. Other students find enlarged graph paper helpful for both vertical and horizontal tracking.

Students who use a tape recorder to record lectures should use one that has a tape counter so they can jot down in their notes the beginning and ending tape counter numbers for concepts or mathematical problems they are finding more difficult to follow during the lecture. This will allow them to concentrate on what the instructor/speaker is doing or saying, rather than trying to continue to take notes. It's important for the student to review that section of the tape as soon as possible to fill in the gaps in his/her notes. Listening to taped notes or textbooks while reading along in the printed material can also be an effective tool since it provides a multisensory approach to learning.



If the accommodation includes using a note-taker, the note-taker should be a member of the same class as the student needing assistance. It is also recommended that the student needing assistance take some notes, leaving gaps of 4 to 5 lines between lecture topics. This keeps the student focused on what the lecturer is saying and also allows the student space to fill in the gaps when recopying the note-taker's notes.

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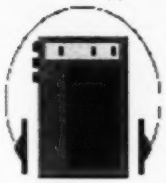

Other suggestions for low-tech accommodations for people who have visual processing disabilities include taking advantage of software program options that enable the user to change text and/or background color and font size; large print written materials or tests; large print transparencies; magnification hardware or software like JAWS for Windows or ZoomText; on-screen keyboards and keyboards that provide voice output; talking, large print browsers for searching the Internet; books on disc which can be input into the computer after which the text can be enlarged and then read back to the user by means of voice output software; optical character recognition software that can be used to scan printed material into the computer which can then be enlarged and read back to the user by means of voice output software; and using videotapes or videodiscs to present material.

Auditory Processing Disorder

People who have auditory processing disorders may have difficulty or be unable to spell, take notes, listen and remember instructions, or hear sounds in the correct order. They may become fatigued when trying to listen to a talk or lecture.

Possible accommodations include allowing the person to sit at the front, facing the person when talking, reducing auditory and visual distractions, and encouraging the person to repeat questions before answering. It is also helpful to "show and tell" all information and directions.

People with auditory processing disorders may also benefit from using a word processor, electronic notebook or a computer with word prediction software when taking notes or writing. Pressure-sensitive paper, carbonless paper that allows the user to tear off copies of lecture notes, can be useful for the person who has difficulty taking notes. FM amplification devices can help the individual focus on the lecturer and block out auditory distractions around them. The speaker wears a transmitter and the student wears the receiver. Electronic spellcheckers, which allow the person to enter a word the way he she thinks it is spelled, are also helpful. Some electronic spellcheckers come with a dictionary and a thesaurus, two sizes of type, and full speech capabilities by letter, word, and entry. Variable speech control tape-recorders enable the individual who has difficulty processing speech to play back the tape at a slower or faster rate without loss of quality.

According to Riviere (1986), individuals with learning disabilities respond best to multimedia multisensory approaches that combine audio and visual techniques such as

reader/scanner software and equipment. One example is the Kurzweil Reader Scanner coupled with Bookwise that can be used to load books on disc onto a computer with voice output. This type of technology provides both auditory and visual input for a person with auditory processing problems. Another example is CART (Computer-Aided Realtime Translation), used in a variety of settings to transcribe what is being said into the computer which simultaneously displays the information on a computer monitor or projects the information onto a wall or screen.

Arithmetic Deficit

A person who has an arithmetic deficit has difficulty with mathematical reasoning, understanding numerical concepts, comprehending math word problems, aligning numbers, and reversing numbers.

A person with this deficit may find it beneficial to use graph paper to align numbers and may need to use fact sheets and/or charts on tests. It is also helpful to provide the individual with instruction on the appropriate sequence or hierarchy of steps needed for a particular task. Testing accommodations might include enlarging the print size and providing large work areas adjacent to each problem, providing extended test time, modification of the test format (oral vs. written), and color-coded problems. Highlighting the function signs and starting and stopping points is also helpful. Hand-held talking calculators, on-screen computer calculator programs with speech synthesis, and special-feature calculators that enable the user to simultaneously select speech options and display operations provide visual and auditory feedback by vocalizing data and resulting calculations through speech synthesis. Large screen

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displays for calculators, big number buttons and large keypads can also be of benefit.

Dysgraphia

A person who has dysgraphia usually has extremely poor handwriting, difficulty with the physical act of writing, and prefers printing over cursive which requires better hand-eye coordination.

Tape-recording lectures and discussions are also of benefit to people with this learning disability. Note-takers (using pressure-sensitive paper as described above in Auditory Processing Disabilities); copies of lecture notes in advance; allowing the person to use a computer, word processor, or electronic notepad to take notes; allowing the student to complete all "writing" assignments outside of class; extended test time; provision of alternate test formats that do not utilize scantron forms; and provision of a scribe for the test are other possible accommodations.

Dyslexia

An individual with dyslexia may have difficulty with comprehension and retention of reading material; difficulty or inability to perform any task which requires reading a textbook, notes, articles, etc.; difficulty or inability to read charts, graphs, and other visual aids; and a slow reading rate.

Possible accommodations for a person who has dyslexia include using a multi-sensory teaching approach, allowing the individual to use colored overlays and taped textbooks, providing extended test time and perhaps a reader or scribe for the test, providing a tape-recorded version of the test, allowing the use of an alternate demonstration of mastery, providing an alternate test site, using a taped textbook (reader/scanner program with speech output), and using a computer with a speech synthesizer. Hearing and seeing what he or she has written helps the individual to identify misspellings, fragments, run-on sentences and other writing errors. Talking spelling checkers and calculators can also help the individual identify transpositions, reversals, omissions, additions, or inversions when he or she copies words or writes numbers.

Language Comprehension

An individual who has a language comprehension disability may have difficulty with vocabulary, difficulty or inability to answer factual questions, difficulty or inability to concentrate during lectures, poor or low reading comprehension, and difficulty or inability to use prior knowledge to perform activities.

Pre-teaching relevant vocabulary and background information is helpful for students with language comprehension deficits. Reducing distractions, allowing the individual to repeat back what was heard and telling the student in advance what question(s) you will be calling on them to answer in class are helpful classroom accommodations.

Technological accommodations include allowing access to a computer or word processor; using FM amplification devices to help the individual focus on the speaker; and using variable speed tape recorders, as described above in auditory processing disorders. Also, tape recorders create a permanent record of oral language that may help students who have memory difficulties or problems with processing oral language.

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Multimedia/Hypermedia

The use of authoring tools like ToolBook or Authorware to develop lessons or presentations, computer graphics, audiotapes and videotapes, CD's, and hypertext are just some of the ways available technology can help instructors, professors, teachers and presenters accommodate the wide variety of preferred learning styles or learning disabilities their students or audience may have. Some of the newest technologies include interactive videos which use a videodisc player connected to a computer to augment computer text and interactive videodiscs that store audio and visual information on a laser disc which can then be played on a computer. (Riviere, 1996)

Criteria for Adoption of LD Concepts

Faculty and trainers will embrace adaptive technology when it can be demonstrated that it will provide a benefit beyond that for a small group of students identified as learning disabled. One set of criteria that would seem to be a good measure of the willingness of faculty to adopt LD technologies to the traditional classroom is identified by E. M. Rogers (1983) in his book *Diffusion of Innovations*. Rogers suggests that the rate of adoption of any innovation is a function of relative advantage, compatibility, complexity, trialability, and observability.

Relative advantage suggests that we perceive a greater advantage by adopting a change than we do by maintaining the status quo. So, if faculty perceive a greater benefit from adopting and applying the capabilities associated with LD technology they will find ways to incorporate these capabilities into their teaching strategies. By introducing greater numbers of faculty to the advantages that adaptive technology can bring and implementing strong evaluation programs, we should be able to demonstrate the relative advantage of broadening the application of LD technology for use in more traditional classroom settings.

A second criteria focuses on how closely the faculty perceives the innovation as being consistent with their values or those of their institutions. The compatibility of the innovations and these values can affect the rate of adoption of LD technology for traditional students. Therefore, if the faculty member's values are consistent with those that accept that adaptive technology can have positive effects beyond the targeted students with learning disabilities, they are more likely to explore its uses.

Like most technology solutions, the higher the learning curve, the more difficult the technology is to use, the less likely it is that it will be implemented. So, complexity becomes an issue in implementing technology solutions into instructional strategies. To the degree that we can simplify the technology solutions for the classroom, we will find much greater willingness to experiment and accept adaptive strategies on the part of classroom teachers and trainers.

Trialability is also a criterion with which we make decisions about how we will use technology interventions. If we can put the technology into the hands of classroom professionals, encourage them to experiment on a limited basis, and to become familiar with the capabilities of LD technology applications, we can generate support at the grassroots level. It is the successes in the classroom that will encourage greater adoption of the tools that will improve the quality of learning for LD and traditional students alike.

The final criterion is observability. Observability is the level of visibility to others of what we do. Rogers' (1983) research tells us the greater the observability of an innovation, the greater its rate of adoption. Success generates a desire in others to follow. The move by institutions and faculty to distance learning demonstrates this concept. As others see the acceptance and successes of early adopters, they are more willing to experiment. The same is true of those who are working to expand the application of LD technologies to more traditional classrooms.

Using these components as part of the need assessment and in the design of instructional programs, we can build new models for adaptive technology application in the classroom.

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